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ABSTRACT

Findings are reported on a three year cross-age tutoring program in which undergraduate dental hygiene students and college students from other disciplines trained upper elementary students to tutor younger students in the techniques of dental hygiene. Data includes pre-post scores on the Oral Hygiene Index of plaque for both experimental and control groups. A discussion on tutoring techniques is also included. (Authors/JD)

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TOOTH TUTORING: THE FINDINGS

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Abstract

Tooth tutoring: The findings presents the three year findings of a unique cross-age tutoring program in which college students train upper elementary students to tutor younger students in the techniques of dental hygiene. Data includes pre-post scores on the Oral Hygiene Index of plaque for both experimental and control groups.

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The curricular development described in the following pages was undertaken in response to a specific need in schools in our community. It was the response to this need, tempered by our own educational philosophy, which gave shape to the program. While we do discuss in this paper how our work relates to more theoretical research on tutoring, we would like to stress that these theoretical ties have been shown for the sake of the reader and do not represent the true underpinnings of the program. We believe that while much curriculum development can and should grow out of theoretical research, much more development can and should be the product of practical or applied research directed toward the resolution of real and immediate problems. (See Schwab, 1975; Schubert, 1980) The fact that this research is less "clean" in no way lessens the credibility of the findings, in our opinion. While laboratory studies or studies in controlled environments can establish cause and effect relationships with greater certainty, applied research in classrooms enhances the replicability of a program once a pilot has been concluded. This replicability increases the likelihood that a program will continue over a period of time. The resulting longitudinal view of a program we consider to be the most accurate way to test hypothesized relationships.

The Joint Educational Project, a resource-sharing partnership between the University of Southern California and eight community elementary and secondary schools located around the university, faces a wide variety of needs, not the least of which is the need for more and better preventative dental health information. Surveys show that one of the most ubiquitous health problems among children in the community is poor dental care. The problem of poor or non-existent dental education programs is compounded by the lack of dentists in the area and almost non-existent free or low cost dental care. For a number of years the University has attempted to alleviate the problems by providing low cost dental care in the School of Dentistry. This approach was, by necessity, a very limited solution.

During the 1973 school year, The Joint Educational Project began to recruit and place dental hygiene students in elementary school classrooms to teach five or six hour "mini-courses" on dental hygiene. These courses provided university students

with practical experience in dental education while making a valuable contribution to the schools. These students were well received but their potential impact was limited to no more than eight classes each semester due to the limited number of dental hygiene students available. It was at this time that the conceptualization of "Tooth Tutors" was made.

During the past decade there has been mounting interest in the possibilities of implementing peer and cross-age tutoring programs in schools. Tutoring holds the promise of individualizing education while holding down the costs through the use of students as "teachers". A number of studies of tutoring have been conducted to ascertain the degree of effectiveness of tutoring programs for both tutor and tutee (Ellson, 1976; Rosenshine and Furst, 1969) and to attempt to explain some of the variables which operate to make tutoring an effective instructional vehicle (Mohan, 1972; Fitz-Gibbon, 1975; Johnson, 1978). The vast majority of these studies have focused on cognitive measures of program effectiveness, frequently cognitive measures of the lowest order involving nothing more than rote learning (e.g., Myers, Travers, and Sanford, 1965). Many of these studies have examined affective outcomes (Fitz-Gibbon, 1975, Klaus, 1975) but generally only superficially with questionnaires about students' attitude toward the tutoring situation and/or their desire to participate again. Much of the literature on tutoring suggests that tutors might be more effective than other instructors in affective education. Rosen Powell, and Schubot (1977) suggest that tutors enjoy high status with their tutees. Theoretically, if tutors enjoying high status demonstrate desirable behaviors to younger, lower status tutees, it seems reasonable to expect attitudinal and behavioral changes in the younger student. The purpose of the described studies was to determine under what conditions tutors could work successfully to reshape the attitudes and behaviors of younger students in relationship to dental hygiene.

Study I

In 1975 the Tooth Tutoring program was initiated at a nearby elementary school, a school with a large Spanish-speaking population. Two teams each composed of three students from the USC School of Dentistry's Department of Dental Hygiene spent 45 minutes a day, 2 days a week, for 4 weeks instructing two fifth grade classes in basic dental hygiene. Included in the course were such things as learning to identify specific structures in the mouth, evaluating the health of teeth and gums, practicing correct techniques of brushing and flossing, selecting healthy food, and learning how to tutor other students. Following the training, each fifth grade class was paired with a first or second grade class for the tutoring. To the greatest extent possible each fifth grade tutor was assigned a single younger student. Tutoring took place during four 30 minute sessions over a five week period. Effectiveness of the program

was measured using a pre-post test control group design with a plaque evaluation indices (Green and Vermillion, 1960) serving as the dependent measure. A pool of fifth and second grade students who received no instruction other than that they might receive in class as a result of regular curricular activities served as the control group.

Study II

Study I was followed a year later with what was intended to be a replication study. Several alterations were made to improve the earlier efforts, to address criticisms, and to try out new features. Third graders were included in Study II to examine the effectiveness of tutoring where tutor and tutee were closer in age. Both classes of tutors were paired with two classes of tutees so that each tutor had an opportunity to teach two younger students the material. The posttest plaque index rather than being taken immediately after the instructional program was delayed for two months in order to get some sense of the resiliency of the behavioral changes. Several minor changes were made in the actual offering of the tutor training including the development of many new activities. Students from a neighboring school served as the control group to minimize problems of contamination as the program reached an ever increasing percentage of the experimental school population.

Study III

Study III represents a serious departure from the earlier studies in that its primary purpose was not to test whether fifth graders could learn to effectively tutor younger students in dental hygiene but rather to determine if volunteers with no personal exposure to a School of Dentistry could train effective Tooth Tutors. Eight undergraduate students from a variety of courses were recruited and given three hours of training in basic dental hygiene. These students (divided into two teams) trained two classes of fifth graders who in turn tutored four classes of second graders. Teams of dental hygiene students taught three classes of tutors who in turn tutored five classes of second graders. These students who were trained or indirectly tutored by dental hygiene students became our control group. Because of the numbers of students being reached by this program, it was necessary to begin branching out to other community schools. These schools contain a population not dissimilar to that in our original experimental school. Again, as with the first two studies, the dependent measure was a pre-post reading of the plaque found on the teeth of participants. Whereas Studies I and II had utilized the plaque indices recommended by Green and Vermillion (1960), the third study used the more sophisticated measure recommended by Podshadley and Haley (1968). Training

sessions during the third study were also somewhat different due to the different patterns of availability of undergraduate students. Instead of going into the schools twice a week for three weeks, undergraduate students participated in the program for forty-five to fifty-five minutes a week for six to eight weeks. Three to four tutoring sessions were held on a weekly basis following tutor training. These sessions were monitored by the students who had trained the tutors whereas tutoring sessions for students in the control group continued to be monitored by classroom teachers, a pattern established in the first two studies due to the unavailability of dental hygiene students.

Results

The results reported in the table on the following page indicate two dramatic findings. The consistency of the pre-treatment measures underscores the need for an effective preventative dental health program. The indices demonstrate relatively high amounts of plaque present both over time and across schools. The consistency of the post-treatment scores offers evidence of the effectiveness of the program. In each case post-test scores were significantly higher* than pre-test scores. In the first two studies the post-test scores of the experimental groups were significantly higher* than those of the control group for both tutors and tutees. In Study III the mean change for the tutors instructed by dental hygiene students was significantly higher ($p < .05$). No significant differences were found to exist among the other three treatment groups.

*$p < .001$

Summary of Data for Studies I, II, & III

CONTROL GROUP (Pool of upper and lower elementary students receiving no treatment)

	Pre	Post	% change
1st study*	3.23	2.85	12%
2nd study*	3.37	3.38	0%

TUTORS (Fifth graders)

	Trained by Dental Hygiene Students			Trained by Undergraduates		
	Pre	Post	% change	Pre	Post	% change
1st study*	3.35	1.37	59%		-	
2nd study*	3.33	2.30	30%		-	
3rd study	3.88	1.34	65%	3.00	1.45	52%

TUTEES (First and second graders)

	Trained by Dental Hygiene Students			Trained by Undergraduates		
	Pre	Post	% change	Pre	Post	% change
1st study*	3.58	2.37	33%		-	
2nd study*	3.47	1.39	60%		-	
3rd study	3.19	1.86	42%	3.27	1.6	51%

*Data for 1st and 2nd studies converted from three point scale to five point scale for purpose of comparison.

Discussion

The findings of this study can be examined in several ways. Despite the "dirty" methodology of conducting the studies in a typical school environment and purposely permitting a degree of flexibility, the consistency of the findings indicates that tutors can effectively alter the dental health habits of younger students. While there is some amount of information exchanged at these sessions, the information in and of itself will not affect plaque concentrations. Most dental hygienists agree that how teeth are brushed is less important than when and how long. Plaque reductions indicate not only better brushing but more regular and more thorough brushing. This change in behavior we believe reflects a change in attitude about the importance of caring for one's teeth.

This change in attitude occurred not only when the instructors were dental hygiene students but also when the instructors were undergraduate students from a variety of courses. While dental hygiene students were most effective in direct instruction of the tutors, there is some evidence that the non-dental hygiene students were more effective in preparing the tutors to instruct younger students. This phenomenon might be credited to the monitoring conducted by the undergraduates helping to keep tutors on target.

Another way to look at the studies is to examine critical decision points in the course of the studies. These decision points, while not examined empirically in the present studies, revolve around a number of the theoretical questions appearing in the literature. The issue which has been central to many of our decisions has been the issue of status and role change. We have consciously attempted to maximize the status of tutors. We have experimented with age differences between tutor and tutee, finding in general the fifth/second grade combination to be the most effective in terms of the comfort of the tutor and the respect of the tutee. We have practiced a policy of gross overtraining of tutors so they may truly feel like "experts" when tutoring other students. Contrary to the recommendations which might be drawn from some studies of tutoring (Ellson, 1976, Ronshausen, 1974), we have avoided the adoption of highly structured tutoring materials in favor of highly flexible tutoring sessions which call upon the tutor to make basic curricular decisions such as how best to teach toward an objective and what materials to use. Again this is done to enhance the status of the tutor.

From the outset, we have held that a sense of rapport between tutor and tutee would be critical if the tutee was to be expected to model his or her behavior after that of the tutor. In training of the tutors for the actual tutoring process, we have concentrated on the relationship rather than on the method of tutoring. This involves a great deal of

role-playing and practicing such things as positive feedback (Johnson, 1978).

As indicated above, several of the decisions in this study were made with full awareness of the need to maximize what we believed to be sound educational practices. Other "decisions" were made for us, results of managerial necessities. One such decision was the restructuring of the program to suit the availability of undergraduate students. The increased effectiveness of tutors monitored by undergraduate instructors suggests that these tutors may have been more successful at staying on task (Sarbin, 1976) then those tutors monitored by a classroom teacher who was only vaguely aware of what the tutors were supposed to be doing.

Yet another way of looking at the studies is to examine the problems encountered in setting up cross-age tutoring programs. Just as we have obtained consistent statistical findings so too have we encountered consistent administrative problems. It is in the light of these very real problems that the positive effects of the program must be weighed. Even with the university's contribution of student instructors for the program, there have been numerous problems in arranging times; getting classes together in one or two locations for tutoring sessions; convincing teachers to follow through with tutoring sessions once tutors had been trained; finding time to train tutors in the midst of vacations, assemblies, and other special events; and persuading teachers and administrators alike that kids can effectively teach other kids. Despite these problems teachers, administrators, and our staff continue to look forward to involvement in the next semester's tutoring program with the knowledge that the problems of administration are offset by real changes in student attitudes and behaviors.

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